# Externalities Revisited: The Use of An Environmental Equity Account

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## Abstract

This exploratory paper attempts to restart a debate about the incorporation of environmental externalities into the cost structure of the organisation. A number approaches are considered; regulation together with all that would follow such as audit and policing; pollution permits, which probably can only be used with a sinking lid application; and other charging mechanisms such as making the private sector pay for public sector capital funding. The fourth alternative, the use of an environmental equity account, has not been widely considered in the literature.

The paper proposes the use of an environmental equity account (after Boone and Rubenstein, 1997) with the express intent of generating a charge for environmental impact based on the cost of control. That is, the cost of implementing state of the art technology compared to that currently in use within the organisation, is used as a balance which may be either paid as a capital sum or carried as a balance sheet entry upon which dividend payments would have to be made. It is envisaged that both capital sums and dividend payments would go to an agency responsible for environmental remediation activity.

**INTRODUCTION**

Interest in environmental accounting began some time ago (Mathews, 1993, 1997), as part of a realisation that organisations only accounted for financial variables and excluded events which were external to the organisation (externalities), or involved interaction with non-contractual parties. Thus, the effects of the organisation on social and environmental variables were not recognised, and were defined out of the accounting equation (Hines, 1988). Early attempts to include social and environmental variables by converting them to a financial form failed (Abt, 1977; Estes, 1976) because the attempts at definition and quantification were unconvincing.

Early theoretical attempts to model the problematic position of accounting in relation to voluntary non-financial disclosures (Mathews, 1984; Gray, 1990) were at least partly concerned with attempts to identify, measure and value externalities, which were usually of a social or environmental nature. Many early contributions to the literature consisted of atheoretical exhortations to disclose additional information; discussions about externalities and the need to capture, value and internalise the resulting financial measures and/or use taxation to achieve a similar outcome; and, relatively unsophisticated attempts to `count heads' in terms of disclosures made by organisations (Ernst and Ernst, 1978, for example).

After some 20-30 years of development, voluntary non-traditional disclosures in annual reports have increased considerably, and there have been many developments in research in the field. The analysis of disclosures and the development of theories which motivate these disclosures (stakeholder theory, legitimacy theory, political economy theory, social contract theory) are now much more advanced (Deegan et al., 2000: Brown and Deegan, 1998; Patten, 1992, 1994). The discussion includes environmental audit by accounting firms, though often without the use of accountants (Power, 1991, 1997). Critical theorists, who were not involved to any extent prior to 1995 (Mathews, 1997) are now offering criticism and comments, although not models or suggested solutions to problems (for example Everett and Neu, 2000).

Arguments about the need to identify, measure, value and internalise externalities have not appeared in the accounting literature for several years. Similarly, arguments in favour of using regulations and/or taxation to force the internalisation of costs also appear to have lost momentum. No doubt the reasons for this situation are many and complex. Public opinion in many Western democracies has turned away from centralised regulation and the use of taxation to satisfy macro-goals. Corporations have begun to move away from grossly polluting practices in terms of 'greening' their processes and products and apparently becoming more concerned about influencing a wider stakeholder body. Annual reports often discuss the effect of the organisation on the environment, but these disclosures have been shown to be selective and concerned with

responding to issues or events of apparent concern to a limited number of specific stakeholders (Deegan and Rankin, 1999; Deegan et al., 2000).

Even if corporations were disclosing all the information available about their activities, this would still be incomplete without reference to externalities. In other words, even the best run and most environmentally managed entity must impact the environment by carrying out any activity at all. Some of the likely effects are:

- Employees travel to work.
- Some employees get stressed by work and require medical treatment.
- Some employees get hurt and require medical treatment.
- Products and services are delivered leading to transport related pollution, traffic costs and injuries.
- Product may be discarded at the end of its life; packaging will be discarded at the beginning of the use of the product.
- Despite improved production methods, discharges to land, water and air are still taking place.
- Production plants often give rise to unsightly buildings, which are also a cause of externalities and negative property valuation adjustments imposed on other property owners.
- The public sector frequently provides the infrastructure, which enable private sector organisations to operate.

Products/services are being costed without the impact of externalities being factored in, and the purchaser/user of a given product/service may still be subsidised by the general public/tax payer/specific individual as the case may be. This cannot be avoided unless the beneficiary and the payer groups are coincident.

What can be done to alleviate this situation? Most suggestions revolve around prohibition and control (by regulation, policing, audit, and legal action), pricing mechanisms, using the taxation system and/or incentives, the use of pollution permits with either regulatory or pricing mechanisms, or more recently the proposal for environmental equity accounts. The objective, in all cases, is to force an organisation to either cease polluting, or to pay for doing so. In either case additional costs will have to be internalised and borne by the organisation and its customers, and not by the general public.

The authors do not suggest that progress in non-traditional disclosures has not been made, or that more information and perhaps better accountability has not been achieved over the past 30 years. However, it is argued that matters which were part of the reformist agenda some time ago, appear to have been deleted over time, not because closure has been reached, or the problems have been

found to have no substance, but because other matters appear to have crowded them off the agenda. This paper is an attempt to put externalities back on the agenda.

These ideas are discussed in the four sections below. The first examines alternatives other than environmental equity accounts, and is entitled Regulation and Pricing. The second section is devoted to the background to environmental equity accounts. The proposed model is presented in the third section, and the concluding comments make up the fourth section.

**SECTION I**

**REGULATION AND PRICING**

This section reviews a number of approaches to dealing with externalities, excluding environmental equity accounts. These include regulation, pollution permits and other charging mechanisms.

**REGULATION**

One approach that could be employed is regulation, together with standards, policing, audit, and prosecution as required. A regulatory approach would involve setting standards for the disclosure of environmentally damaging discharges. These would have to be policed, audited, and where appropriate prosecution for infringements would follow leading to financial penalties. The latter would be internalised, thus raising the cost of production. To avoid the financial penalties, the organisation would have to avoid the discharges, if necessary by developing and paying for more efficient means of production.

The problems with the regulatory strategy are; firstly, there is the difficulty of getting extensive regulations in place to cover a wide range of pollutants and being able to successfully identify the origin of the discharges. In addition, the cost of policing, audit etc. is going to be high, probably higher than using tax revenues to deal with the effects of the discharges. Nevertheless, in an ideal world the nature and volume of major discharges should be known to the monitoring authorities. Many/all of the techniques/approaches discussed in this section rely upon a reasonable level of data about discharges from individual plants.

Secondly, the prevailing political realities are that although the public does not want discharges of pollutants, they do not want `big' government, and may not like the increased prices which result from the internalisation of pollution costs. Of course, if pollution continues, there are other costs to be borne which may not be monetary but are real nonetheless (higher morbidity rates and lower quality of life for example).

Thirdly, the application of strong regulations does not necessarily result in the cessation of discharges. If organisations cannot produce without discharges, or are prepared to pay the fines in the short term, then discharges will continue. Stronger action such as closing plants down may bring other negative consequences such as unemployment. The regulatory approach appears to have a major role only when discharges are sufficiently toxic that they are a danger to the public, or when all other avenues have been considered.

**POLLUTION PERMITS**

The use of pollution permits gives rise to some strong views as evidenced by the papers in a special edition of *Critical Perspectives on Accounting* in 1996. The issue presented a paper by Wambsganss and Sanford (1996) and three critical commentaries by Lehman, Milne and Gibson.

The article by Wambsganss and Sanford (1996) illustrated the problems that may occur when environmental issues are seen as amenable to treatment using standard financial accounting models. They proposed that pollution allowances issued free of charge to utilities by the US Environment Protection Agency (EPA) should be treated as donated assets in the books of the recipients, with corresponding increases in contributed capital. When used to compensate for pollution, the book value of the allowances would be entered as part of the cost of production and closed to retained earnings at the end of the period. The authors argued that this would more effectively estimate the costs of pollution in the financial statements, and implement a market solution. The paper brought a strong response from the three commentators.

Lehman (1996) argued that environmental accounting on that basis failed to tackle the urgencies of the environmental issue. The author asserted that environmental accounting would prove destructive of nature because it does not contextualise the relationship between humanity and nature:

> How we determine the environmental crisis depend on our ideological viewpoint. **f** it is accepted that pollution is a by-product of human activities, then, it is better that polluters pay some part of the cost. If, however, the preferred alternative is not to pay and not to pollute then providing a mechanism such as “pollution permits” would act against established political structures. (Lehman, 1996, p.675).

Milne (1996) argued that the proposal relied on unacceptably narrow assumptions, that utilities and their shareholders own rights to pollute, and that economic efficiency should be the sole arbiter in determining the regulation of environmental resources. Furthermore, it was argued that an analysis of US emissions regulations shows that both assumptions were invalid.

Gibson (1996) argued that reporting pollution allowances was not the real problem in addressing atmospheric pollution, rather the problem was the economic philosophy which attempted to address ecological problems in economic terms. Alternatives to the valuation of permits were explored within both market and non-market frameworks. Clearly, as set out by Gibson (1996), there are alternatives to the use of tradable pollution permits to reduce pollution and reduce environmental degradation.

The angst of the three commentators is understandable since the specific pollution permit scheme did nothing to reduce pollution, or to force any changes or charges on a polluting industry. One of the problems was the donation of the pollution permits by the EPA. Another issue was the lack of any evidence of attempts to reduce polluting discharges through the use of a sinking lid approach.

If the EPA charged for the permits, operators would probably rank their plants in order from least to most polluting, and the older and less environmentally friendly plants would be upgraded or phased out as permitted discharge capacity was used up. The charge would be internalised immediately, however, the reduction in discharges would not be achieved unless a `sinking lid policy' was also adopted. Under this strategy, regardless of whether the permit was charged for, the maximum discharges by the industry as a whole would be progressively reduced over time. The effect would be to drive out polluting plants and reduce discharges, with the costs of replacing older capacity being internalised by the producers. Had these alternatives been under discussion the reactions of the commentators in the previously cited journal might have been different.

**OTHER CHARGING MECHANISMS**

The issue of externalities is wider than just accounting for or preventing pollution. As noted in the introductory section, externalities can be much wider including the costs to the employees and to non-contractual parties. Mathews (1984, 1993) described attempts to account for these costs as Total Impact Accounting which was defined as:

> The term total impact accounting (TIA) refers to attempts at measuring, in monetary terms, the total cost of running an organization in its existing form. The total cost of running an organization may be divided between private and public costs (Mathews, 1993, p.130).

Although the author subsequently treated externalities as mainly the public costs of pollution, there were references to other issues such as the costs of congestion, reduced property values and the value of public improvements (Mathews, 1993, pp.137-138).

Gray et al. (1996) have noted that if the unsustainable aspects of economic activity were added to the conventional private costs, then no corporations would make a profit (Gray et al., 1996, p.297).

In a different context, it could be argued that if the cost of publicly funded facilities were charged to economic organisations (where appropriate), at least some of them would be shown to be net receivers, and therefore running at a loss in conventional financial accounting terms.

Mathews (2000) has proposed the development of macro-social accounting disclosures, especially where government provides infrastructural assets for the use of private sector organisations. This is part of the Total Impact Accounting concept, which may provide the basis for other charges to be borne by the private sector organisation rather than the general public. This is another aspect of internalising externalities, but this time not related to pollution.

**THE PROVISION OF SPECIFIC INFRASTRUCTURE ITEMS**

There are occasions where public funding is used to provide specific items of infrastructure from scratch, or to modify and extend existing facilities, solely for the use of one or more private sector organisations. For example, the provision of port facilities, the extension of airport facilities or the construction of a spur rail line may be funded out of public funds to achieve specific goals. Presumably those goals might include furthering commercial relationships with one or more organisations, to create employment opportunities, either at the enterprise(s) which benefit directly, or both there and elsewhere, so that the aggregate economic activity will lead to taxation revenue, foreign exchange earnings, or the reduction of social costs, which in total will be greater than the initial cost to the public purse. If that is not the case the public might be excused for wondering why the funds are provided in the first place!

The current difficulty (in terms of accounting and reporting) is that neither government, nor the private sector enterprise, appears to disclose sufficient information to enable the wisdom or otherwise of the investment to be judged. It could be argued that the cost of providing the facilities is analogous to an externality in that it is a private cost borne by the public, and should be internalised as part of the cost of the activity of the private sector organisation. One way of bringing issues of this nature into open discussion would be for both public and private sector organisations to disclose: details of facilities provided by government funding, whether local or central, and contributions made either directly or indirectly by the organisation to offset the investment. Examples might be taxation or other charges, increased employment or reduced social costs; details of specific direct funding to keep the business operating (if any); together with estimates of the benefits to society of continued operation. In some instances it may be shown that an organisation is a net producer of resources rather than a net consumer of resources, and the externalities are positive and not negative.

The reader would expect to find the corresponding data in the public accounts of the agency providing the facilities. Although bound to be contentious, this suggestion is really no more than common sense; private sector organisations should, over time, be expected to fund all of their activities. If they do not then the taxpayers are subsidising the returns to shareholders, usually a minority group in society, and issues of equity will become paramount. Equally, private sector organisations should be expected to be rewarded for all of their activities. If not, the taxpayers are benefiting at the expense of the shareholders. Once the information was available it could be used to determine reasonable charges and prices for the use of the infrastructure and facilities. A charge would automatically result in the internalising of the costs and their inclusion in the cost of the good or service produced.

**THE ABSORPTION OF EXTERNALITIES CREATED BY AN ORGANISATION**

Discussions about externalities have tended to be dominated by the problems of pollution, however, the externalities referred to here are those non-pollution events, which result from the organisation operating where and how it operates. For example, added road traffic may increase the cost of maintaining highways; and perhaps industrial accidents should be a charge on the enterprise and not on the local community. It may be argued that local authority charges and taxation pay for these costs, however, there is little information provided to verify this and a great deal more transparency is needed, for example with disclosures of: contributions to the local government via taxes and charges; the employment benefits conferred on the local area (which offsets the cost of externalities); estimated costs of externalities such as traffic congestion, road accidents and health related activities.

The organisation cannot be expected to be regarded as legitimate if it imposes externalities on the local community (or the wider community either although this may be less obvious). The cost of some externalities could, perhaps, exceed the payment of rates, local taxes etc., leaving the community with a net loss; although the provision of employment and the multiplier effect of local spending will probably prevent this. However, without appropriate information any debate concerning the benefits of an organisation to the local or central government is bound to be rather sterile and uniformed. Once again the objective would be to determine charges which recouped costs and thus avoided externalities being imposed on local residents. Charges would become part of the internal costs of operations.

**SUMMARY OF SECTION I**

This section of the paper has considered three possible strategies for charging externalities back to the organisation responsible for generating them; namely, regulation, pollution permits and other charging mechanisms. The application of a strong regulatory framework, together with the

necessary policing and enforcement mechanism, is probably not workable at this time excepting where discharges are a danger to the public health and welfare. Pollution permits could be useful if applied with a sinking lid or defined reduction in the level of discharges applied to the industry as a whole. It may also be appropriate to require payment for the permit, and not to distribute it free of charge. The general strategy would be to force the industry to voluntarily replace or modify older and less efficient plants.

In the sub-section entitled "Other Charging Mechanisms" consideration was given to a variety of externalities and public costs, not necessarily environmental in nature, whereby the organisation is provided with infrastructural support by public expenditures and the absorption of non-environmental externalities. Although it may be argued that these are legitimate expenses of government and paid for in whole or in part by corporate taxes, but of course to date this has not been tested. A counter-argument would be that direct charges to the organisations that benefit would relieve the taxpayer of expenses, and provide a direct cost to be internalised in the cost of production of goods and services. Direct user charges could replace corporate taxes to a greater or lesser extent.

**SECTION II**

**ENVIRONMENTAL EQUITY ACCOUNTING**

The previous section has considered how externalities may be charged to the entity responsible for their generation; by (1) vigorously regulating discharges to force organisations to internalise costs either by purchasing new technology or by paying fines, and/or (2) by giving permission to discharge under permitted conditions (financial charges, sinking lid allowances), and/or (3) by charging for non-polluting externalities in the form of services/facilities provided for the use of the organisation. Note that none of the first three approaches indicates that externalities can be determined in financial terms with any precision, even if physical measurements can be made, and total discharges estimated. Indeed the full cost of discharges to society would include all the effects and their mitigation and remediation, which would be problematic to calculate. Thus, if externalities were internalised but not prevented, there would still need to be public expenditures to mitigate the effects of the charges.

An alternative approach has been suggested in an attempt to develop financial measurements to fit into a more usual accounting format. This has been called Environmental Equity Accounting by Boone and Rubenstein (1997) and Epstein (1996).

Boone and Rubenstein (1997) reported on the use of what they described as Full Cost Accounting (FCA), to integrate economic and environmental information with business decisions. They noted

that traditionally, externalities were not included in the cost or price of products, but borne by individuals or by society at large. Monetised external impacts are those, which have been estimated in financial terms, and therefore differ from those which are described quantitatively and/or qualitatively, but are not able to be monetised.

Two main approaches to determining externalities in monetary terms were suggested (1) the cost of control approach using the cost of installing and operating environmental control technologies as an approximation of the value of the externalities removed, and (2) the damage function approach where environmental and scientific data are incorporated with economic models and methods to estimate external impacts and costs.

The two are described by Boone and Rubenstein (1997) as follows:

> The cost of control approach uses the cost of installing and operating environment control technologies as an approximation of the dollar value of externalities incurred. Proponents of this approach argue that the cost of the last unit or highest cost of control under existing environmental standard provides an estimate of the price that society is willing to pay for a given level of environmental protection. The underlying assumption here is that regulators have weighed the cost of the control technologies against society's willingness to pay and the benefits of reduced environmental impact.
>
> In contrast, under the damage function approach, environmental and scientific data and modeling techniques are combined with economic methods to estimate external impacts and costs (Boone and Rubenstein, 1997, p.19).

Epstein (1996) included consideration of monetised environmental externalities in his chapter on capital budgeting systems. He also used Ontario Hydro as an example organisation, where a number of methods of calculating external effects have been examined but not for the purpose of financial disclosures. He observed that:

> We can consider measuring environmental costs based on the cost to control pollution before it occurs, the cost to clean up pollution after it has occurred, or the cost of repairing damage to the environment caused by the pollution….Identifying and measuring external environmental costs is important for the environment and likely will be internalized through regulation (Epstein, 1996, p.191).

Boone and Rubenstein (1997) discussed the use of this information in both internal and external reporting and decision making. In terms of the external reporting system they suggested that the concept of a financier and a prospector joining forces with the prospector receiving equity to the value of mining rights, as a basis for suggesting the use of the Environmental Equity Account. In a subsequent example the monetised externalities are based on statistical and scientific analysis and economic modeling arrived at by internal (within company) determination. In the example used, the company does not incorporate externalities among the costs of inputs. However, we see that feature as an essential part of the process.

Boone and Rubenstein (1997) noted that environmental obligations would not meet the normal definitions of either assets or liabilities, however, this was because of the parameters which they used in their examples, and the way in which the authors regarded the process an internally generated and limited to the one organisation. The article did not envisage government backing for the inclusion of the Environmental Equity Account (EEA) as part of GAAP. The mechanism envisaged is that the EEA is a part of the ownership accounts:

> The Environmental Equity Account is a quasi-ownership interest in the wealth of an enterprise that is based on a non-monetary contribution of material human, intellectual, social or natural capital, essential for the reporting enterprise to remain a going concern (Boone and Rubenstein, 1997, pp.21-22).

Increases in the EEA would have a corresponding entry among the expenses of the operation i.e. externalised costs would be internalised and added to the expenses of production. Boone and Rubenstein (1997) suggested that:

> Accountants interested in rendering a real accounting of a company may find that there is a need to develop new rules based on all the resources the company consumes (both privately and commonly held). To do this, they may have to recognize that the environment has the same status as any other factor of production, whether it be land, labour or capital (Boone and Rubenstein, 1997, p.22).

Boone and Rubenstein (1997) did not set out to provide a model to be universally applied, but confined their article to reporting an actual experimental approach by Toronto Hydro.

**SECTION III**

**THE PROPOSED MODEL**

This paper will now attempt to set out a possible extension of the work of Boone and Rubenstein (1997), which could be implemented by Government agencies, together with professional accounting bodies, generating pressures for the internalisation of a surrogate for externalities. Using the argument proposed by Boone and Rubenstein (1997) it will be assumed that a realistic surrogate may be obtained using the cost of control approach, as determined by a government agency, and then given support as GAAP by the professional accounting body. This process is similar to the use of government valuers to place `official' values on properties for the determination of property taxes.

In this proposal the EEA would be created by the authority of corporation law and the normal double-entry mechanism would be used. The balance of the EEA may be written off as a charge against production, and the actual cash paid to the agency responsible for cleaning up and remediating the effects of the pollution caused (since discharges will continue unless the organisation pays for the installation and operation of the technology upon which the cost of control approach is based). If the organisation installs and operates state of the art equipment pollution would be reduced to the best possible level at that time, there would be no balance in the EEA and the costs will have been internalised. Where the EEA remains as a residual quasi-owners account, the balance would be eligible for the payment of dividends in the same way as other equity holders. The dividends would be paid to the same agency responsible for cleaning up externalities.

Valuations could be made periodically, perhaps every three years, and any increases over the previous period, presumably caused by changes in output, technology, maintenance of the equipment or operating practices, would lead to higher dividends or capital payments to reduce the balance of the EEA. Management would be able to choose between investing in the technology, paying the dividends, paying off the capital balance of the EEA, or some combination of these alternatives. Payments should not be consolidated with other revenue, but would have to be kept separate for environmental remediation if the system is to achieve an improvement in the condition of the environment.

This proposal (or one similar to this) would ensure that a figure approaching environmental imp[act costs would be charged to products and services, either because of write offs from the EEA, or dividends paid to the agency responsible for environmental cleanup and maintenance. Apart from the contentious issue of a government imposed EEA, the main problem would lie in the initial determination under the cost of control approach. Of course, there would not be an EEA if the

producing organisation employed state of the art technology which reduced any material discharges, which is the objective of any movement to identify, measure, and value externalities.

**SECTION IV**

**CONCLUDING COMMENTS**

In recent years large corporations have begun to make more environmental disclosures in annual reports, or in a separate environmental report. Unfortunately, these reports vary in quality and content. They are also voluntary, unaudited, and in many instances produced by personnel with public relations rather than accountability roles. Furthermore, no matter how much effort is put into these reports, and regardless of how good the report really is, the issue of externalities is not addressed.

This paper has considered a variety of ways that externalities could be identified, measured, valued and thus internalised, where they would become part of the operating costs of the product/service provided. The use of regulations/audit/legal action to reduce discharges would be difficult to operate, and may only be feasible in cases of public danger through toxicity. The use of pollution permits and thus charges for operations was also considered. Pollution permits, it is argued, only reduce discharges and impose costs which must be internalised if there is a direct charge or a sinking lid policy of gradually reducing permitted discharges. Charges for operations were examined including charges for the public costs expended in providing the infrastructure for private sector use and also remedying the externalities (non-polluting type) which may be identified.

A novel development was the notion of the environmental equity Account (EEA) proposed in Boone and Rubenstein (1997). The basic idea was adapted in this paper in a way that the authors believe could lead to a mechanism for internalising externalities. Estimates of externalities would be determined using the cost of control approach, and organisations would be legally required to carry this figure as an EEA balance unless it was discharged by payment to an agency responsible for mitigating the effects of environmental pollution. EEA balances carried forward would be eligible for dividend payments, also to be made to the environmental repair and maintenance unit.

The authors argue that regardless of the method or methods employed to progress the issue, the current standing of environmental accounting as a voluntary, unstandardised and unaudited activity in the hands of the preparers, with no reference to the internalisation of externalities, should not be allowed to continue, and we would like to see further debate on this important matter.

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2000